Kramer Electronics, Ltd.

USER MANUAL

Model:

VS-88DTP

8x8 DVI - Twisted Pair Matrix Switcher

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1 Introduction

Welcome to Kramer Electronics! Since 1981, Kramer Electronics has been providing a world of unique, creative, and affordable solutions to the vast range of problems that confront the video, audio, presentation, and broadcasting professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better! Our 1,000-plus different models now appear in 11 groups[1] that are clearly defined by function.

Thank you for purchasing the Kramer **VS-88DTP** *8x8 DVI - Twisted Pair Matrix* Switcher, which is ideal for conference room presentations and advertising applications, as well as for rental and staging.

Each package includes the following items:

- The **VS-88DTP** *8x8 DVI - Twisted Pair Matrix Switcher*
- Power cord[2]
- Windows®-based Kramer control software[3]
- Windows®-based Ethernet Configuration Manager and Virtual Serial Port Manager
- Kramer **RC-IR3** *Infrared Remote Control Transmitter* (including the required batteries and a separate user manual[4])
- This user manual[4]

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual
- Use Kramer high-performance high resolution cables[5]

1 GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Matrix Switchers; GROUP 3: Control Systems; GROUP 4: Format/Standards Converters; GROUP 5: Range Extenders and Repeaters; GROUP 6: Specialty AV Products; GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity; GROUP 10: Accessories and Rack Adapters; GROUP 11: Sierra Products

2 We recommend that you use only the power cord supplied with this device

3 Downloadable from http://www.kramerelectronics.com

4 Download up-to-date Kramer user manuals from http://www.kramerelectronics.com

5 The complete list of Kramer cables is on http://www.kramerelectronics.com

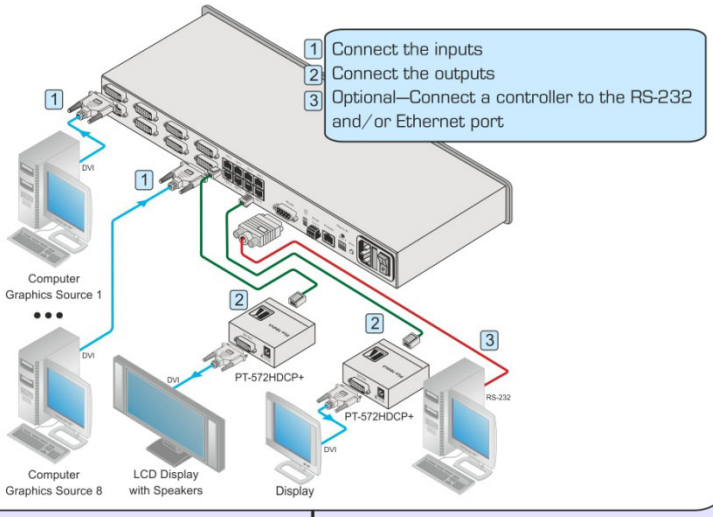
2.1 Quick Start

This quick start chart summarizes the basic setup and operation steps.

Step 1: Mount the device - see Section 5

Mount the machine in a rack or stick the 4 rubber feet to the underside and place the device on a shelf

Step 2: Connect the inputs and outputs - see Section 6



Step 3: Turn the power on

Step 4: Configure the device - see Section 7

Acquire the EDID from: One output, several outputs or the default EDID

Step 5: Operate the device - see Section 7

Operate via the front panel buttons, IR remote control, RS-232, and/or Ethernet

Route an input to an output

Press an output key followed by an input key

Store and recall a setup

To store:
1. Set the machine to the desired setup.
2. Press the STO button.
   The STO button blinks.
3. Select an IN or OUT button to store the machine setup.
4. Press the LOCK button to store the current setup.

To recall:
1. Press the RCL button.
   The RCL button blinks.
2. Press the relevant OUT button.
3. Press the LOCK button to recall the stored setup.

3 Overview

The high quality Kramer **VS-88DTP** is an *8x8 DVI - Twisted Pair Matrix Switcher* that accepts up to eight DVI inputs and routes any or all of them to any or all eight TP (Twisted Pair) outputs for connection to compatible TP receivers, for example, the **PT-572HDCP+** or **TP-574**.

The **VS-88DTP** features:

- I-EDIDPro™ Kramer Intelligent EDID Processing™, an intelligent EDID handling and processing algorithm that ensures Plug and Play operation for DVI systems
- An OFF button to disconnect one or all outputs
- A LOCK button to prevent unwanted tampering with the front panel buttons
- 16 preset memory locations for storing configuration configurations
- 1U height that fits a standard 19" professional rack enclosure

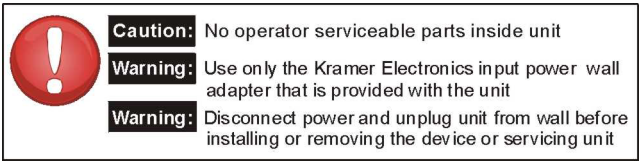
You can control the **VS-88DTP** using the front panel buttons, or remotely via:

- RS-232/RS-485 serial commands transmitted by a touch screen system, PC or other serial controller
- The Kramer infrared remote control transmitter
- Ethernet over a LAN
- An external remote IR receiver (optional, see Section 4.1)

3.1 Recommendations for Best Performance

To achieve the best performance:

- Use only high-quality connection cables[1] to avoid interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables).
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality and position your Kramer **VS-88DTP** away from moisture, excessive sunlight, and dust


Caution:
No operator serviceable parts inside unit
Warning:
Use only the Kramer Electronics input power wall adapter that is provided with the unit
Warning:
Disconnect power and unplug unit from wall before installing or removing the device or servicing unit

1 Available from Kramer Electronics on our Web site at http://www.kramerelectronics.com

3.2 Using Twisted Pair Cable

Kramer engineers have developed special twisted pair cables to best match our digital twisted pair products; the Kramer **BC-DGKat524** (CAT 5 24 AWG), the Kramer **BC-DGKat623** (CAT 6 23 AWG cable), and the Kramer **BC-DGKat7a23** (CAT 7a 23 AWG cable). These specially built cables significantly outperform regular CAT 5/CAT 6/CAT 7a cables.

4 Defining the VS-88DTP 8x8 DVI - Twisted Pair Matrix Switcher

Figure 1 and Table 1 define the front view of the **VS-88DTP**.

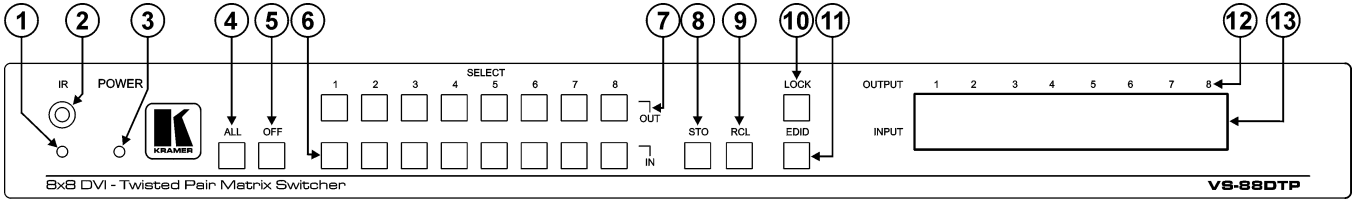


Figure 1: VS-88DTP 8x8 DVI - Twisted Pair Matrix Switcher Front View

Table 1: VS-88DTP 8x8 DVI - Twisted Pair Matrix Switcher Front Panel Features

#	Feature	Function
1	*IR* LED	Lights yellow when receiving a signal from an IR remote control
2	*IR* Sensor	IR remote control signal receiver
3	*POWER* LED	Lights green when the device is powered on
4	*ALL* Button	Press to select all outputs (see Section 7.1)
5	*OFF* Button	Press to disconnect one or all outputs (see Section 7.2)
6	*SELECT IN* Buttons	Press to select an input (1 to 8) following the selection of an output
7	*SELECT OUT* Buttons	Press to select an output (1 to 8) followed by the selection of an input
8	*STO* Button	Press to store a matrix configuration
9	*RCL* Button	Press to recall a matrix configuration
10	*LOCK* Button	Press and hold to toggle locking and unlocking the front panel buttons (see Section 8.2.4)
11	*EDID* Button[1]	Press to acquire the EDID (see Section 7.5)
12	*OUTPUT* Numbers	Indicates the relevant output to which an input (1 to 8, shown on the 7-segment display) is currently switched
13	7-segment Display	Displays the selected video input switched to the output (marked above each input)

1 Lights when configuring the EDID

Figure 2 and Table 2 define the front view of the **VS-88DTP**.

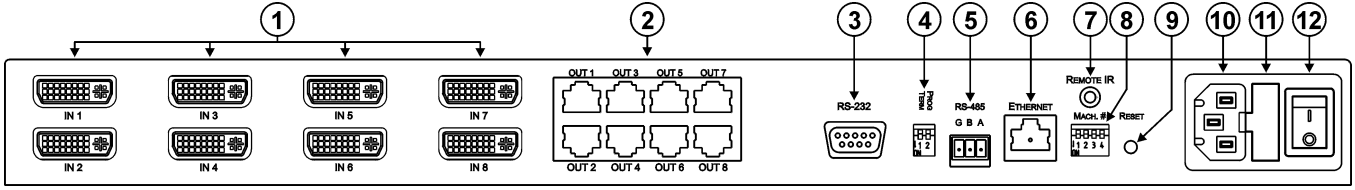


Figure 2: VS-88DTP 8x8 DVI - Twisted Pair Matrix Switcher Rear View

Table 2: VS-88DTP 8x8 DVI - Twisted Pair Matrix Switcher Rear Panel Features

#	Feature	Function	
1	*IN 1* to *IN 8* DVI Input Connectors	Connect to the DVI sources	
2	*OUT 1* to *OUT 8* RJ-45 TP Output Connectors	Connect to the TP receivers (for example, PT-572HDCP+ and TP-574)	
3	*RS-232* 9-pin D-sub (F)	Connect to a PC or other serial remote controller	
4	*PROG TERM* 2-way DIP-switch	DIP-switch 1 Sets the RS-485 bus termination (see Section 6.2.2) Up = Off, Down = On. Default = On	DIP-switch 2 Sets the Programming mode. Only for the use of Kramer service personnel. Default = Off
5	*RS-485* 3-pin Terminal Block	Connect to a serial controller or to another VS-88DTP unit. Connect G to Ground, B to B, and A to A (see Section 6.2)	
6	*ETHERNET* RJ-45 TP Connector	Connect to a PC or LAN for remote control	
7	*REMOTE IR* 3.5mm Mini Jack	Connect to an external IR receiver unit for controlling the device via an IR remote controller (instead of using the front panel IR receiver)	
8	*MACH #* DIP-Switch	Sets the RS-485 bus machine number (see Section 6.2.1)	
9	*RESET* Button	Press the reset button while turning the device on in order to reset the Ethernet factory default definitions (see Section 10)	
10	AC Power Receptacle	Connect to the AC mains power supply	
11	AC Mains Fuse	AC mains supply protection fuse	
12	AC Mains Power Switch	Turns the AC mains power supply to the device on and off	

4.1 Using the IR Transmitter

You can use the **RC-IR3** IR transmitter to control the device via the built-in IR receiver on the front panel or, instead, via an optional external IR receiver[1]. The external IR receiver can be located up to 15m (48ft) away from the device. This distance can be extended to up to 60m (197ft) when used with three extension cables[2]

Before using the external IR receiver, be sure to arrange for your Kramer dealer to insert the internal IR connection cable[3] with the 3.5mm mini jack that fits into the REMOTE IR opening on the rear panel. Connect the external IR receiver to the REMOTE IR 3.5mm mini jack.

1 Model: C-A35M/IRR-50

2 Model: C-A35M/A35F-50

3 P/N: 505-70434010-S

5 Installing the VS-88DTP in a Rack

This section provides instructions for rack mounting the unit.

Before Installing in a Rack

Before installing in a rack, be sure that the environment is within the recommended range:

OPERATING TEMPERATURE:	0º to +55ºC (32º to 131ºF)
STORAGE TEMPERATURE:	-45º to +72ºC (-49º to 162ºF)
HUMIDITY:	10% to 90%, RHL non-condensing

CAUTION!

When installing on a 19" rack, avoid hazards by taking care that:

1. It is located within the recommended environmental conditions, as the operating ambient temperature of a closed or multi unit rack assembly may exceed the room ambient temperature.

2. Once rack mounted, enough air will still flow around the machine.

3. The machine is placed straight in the correct horizontal position.

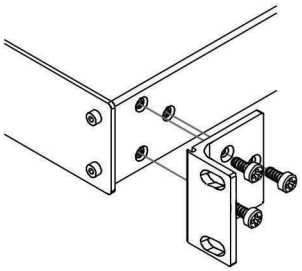
4. You do not overload the circuit(s). When connecting the machine to the supply circuit, overloading the circuits might have a detrimental effect on overcurrent protection and supply wiring. Refer to the appropriate nameplate ratings for information. For example, for fuse replacement, see the value printed on the product label.

5. The machine is earthed (grounded) in a reliable way and is connected only to an electricity socket with grounding. Pay particular attention to situations where electricity is supplied indirectly (when the power cord is not plugged directly into the socket in the wall), for example, when using an extension cable or a power strip, and that you use only the power cord that is supplied with the machine.

How to Rack Mount

To rack-mount a machine:

1. Attach both ear brackets to the machine. To do so, remove the screws from each side of the machine (3 on each side), and replace those screws through the ear brackets.



2. Place the ears of the machine against the rack rails, and insert the proper screws (not provided) through each of the four holes in the rack ears.

Note:

- In some models, the front panel may feature built-in rack ears
- Detachable rack ears can be removed for desktop use
- Always mount the machine in the rack before you attach any cables or connect the machine to the power
- If you are using a Kramer rack adapter kit (for a machine that is not 19"), see the Rack Adapters user manual for installation instructions available from: http://www.kramerelectronics.com)

6 Connecting the VS-88DTP 8x8 DVI - Twisted Pair Matrix Switcher

To connect the VS-88DTP as illustrated in the example in Figure 3:

1. Connect up to eight DVI sources[1] (for example, computer graphics sources) to the IN 1 to IN 8 DVI connectors.
2. Connect the OUT 1 to OUT 8 TP connectors to up to eight[2] TP receivers (for example, the PT-572HDCP+ and TP-574).
3. If required, connect a controller to the RS-232 (see Section 6.1) and/or Ethernet port (see Section 6.3).
4. Connect the power cord (not shown in Figure 3).
5. If required, acquire the EDID (see Section 7.5).

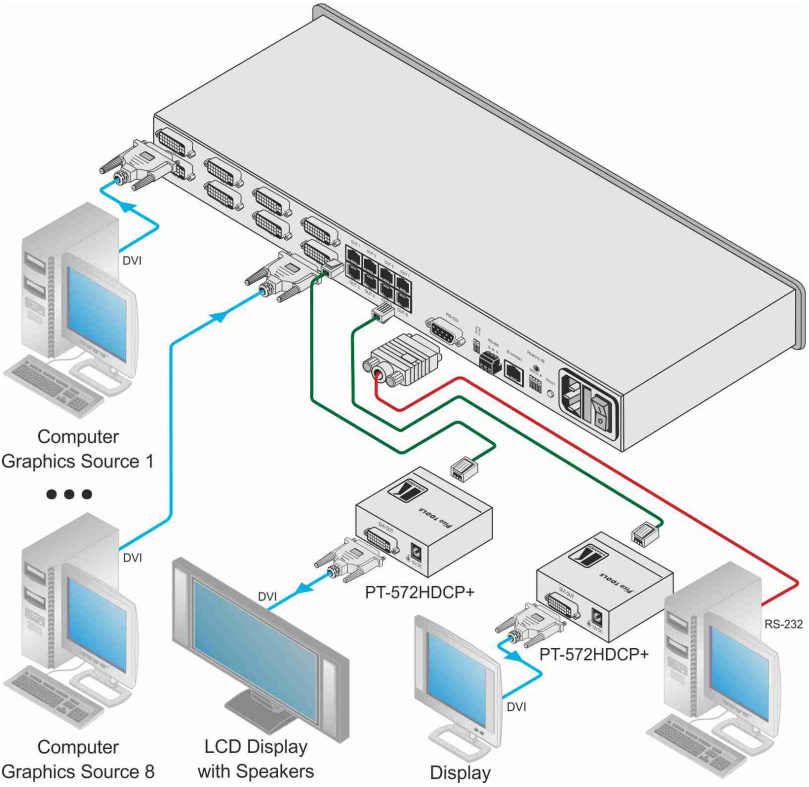


Figure 3: Connecting the VS-88DTP 8x8 DVI - Twisted Pair Matrix Switcher

1 You do not have to connect all the sources

2 You do not have to connect all outputs

6.1 Connecting to the VS-88DTP via RS-232

You can connect to the **VS-88DTP** via an RS-232 connection using, for example, a PC. Note that a null-modem adapter/connection is not required.

To connect to the **VS-88DTP** via RS-232:

- Connect the RS-232 9-pin D-sub rear panel port on the **VS-88DTP** unit via a 9-wire straight cable (only pin 2 to pin 2, pin 3 to pin 3, and pin 5 to pin 5 need to be connected) to the RS-232 9-pin D-sub port on your PC

6.2 Connecting to the VS-88DTP via RS-485

You can operate the **VS-88DTP** via the RS-485 port from a distance of up to 1200m (3900ft) using any device equipped with an RS-485 port (for example, a PC). For successful communication, you must set the RS-485 machine number and bus termination.

To connect a device with a RS-485 port to the VS-88DTP:

1. Connect the TxD+ pin on the RS-485 port of the PC to the A pin on the RS-485 port on the rear panel of the **VS-88DTP**.
2. Connect the TxD– pin on the RS-485 port of the PC to the B pin on the RS-485 port on the rear panel of the **VS-88DTP**.
3. If shielded TP cable is used, the shield may be connected to the G (ground) pin on the unit.

6.2.1 Setting the RS-485 Machine Number

When several **VS-88DTP** units are connected, the machine number determines the unique identity of the **VS-88DTP** on the bus (see Table 3).

Note:

- When using a stand-alone **VS-88DTP** unit, set the machine number to 1 (factory default)
- When connecting more than one **VS-88DTP**, set the first machine (connected via RS-232) to be machine number 1. The other **VS-88DTP** units must each be set to a unique machine number between 2 and 16

The machine number on the **VS-88DTP** is set using the DIP-switches on the rear panel.

To set the RS-485 machine number using the DIP-switches:

Figure 4 illustrates the factory default MACH # DIP-switch settings.

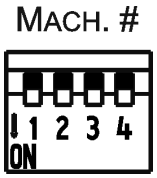


Figure 4: RS-485 DIP-switches

DIP-switches 1, 2 and 3 determine the RS-485 machine number of the **VS-88DTP**.

Table 3: Machine Number DIP-switch Settings

Machine Number	1	2	3	4
1 (Default)	OFF	OFF	OFF	OFF
2	OFF	OFF	OFF	ON
3	OFF	OFF	ON	OFF
4	OFF	OFF	ON	ON
5	OFF	ON	OFF	OFF
6	OFF	ON	OFF	ON
7	OFF	ON	ON	OFF
8	OFF	ON	ON	ON
9	ON	OFF	OFF	OFF
10	ON	OFF	OFF	ON
11	ON	OFF	ON	OFF
12	ON	OFF	ON	ON
13	ON	ON	OFF	OFF
14	ON	ON	OFF	ON
15	ON	ON	ON	OFF
16	ON	ON	ON	ON

6.2.2 Setting the RS-485 Bus Termination

DIP-switch 1 sets the RS-485 bus termination of the **VS-88DTP**. Only the first and last physical units on the RS-485 bus must be terminated, all others must be unterminated. Moving the DIP-switch up turns the termination off (default), moving the switch down enables the termination.

Figure 5 illustrates the factory default PROG TERM DIP-switch positions.

Figure 5: RS-485 Termination DIP-switch

6.2.3 Connecting and Controlling Multiple VS-88DTP Devices

You can daisy-chain up to 16 **VS-88DTP** devices with operation via RS-232 from a PC or serial controller (see Figure 6).

To daisy-chain up to 16 VS-88DTP devices:

1. Connect the RS-232-1 port[1] on the first **VS-88DTP** device to the PC (see Section 6.1).
2. Connect the RS-485 terminal block port on the first device to the RS-485 port on the second device, and so on for all devices. (Connect A to A, B to B, and G to G.)
3. Set the machine number and termination as follows:
   - The first device is machine number 1 and the subsequent seven devices are machine numbers 2 to 16 (see Section 6.2.1)
   - Terminate the first and last devices, that is, terminate machine numbers 1 and 16. Ensure that all other devices are unterminated (see Section 6.2.2)

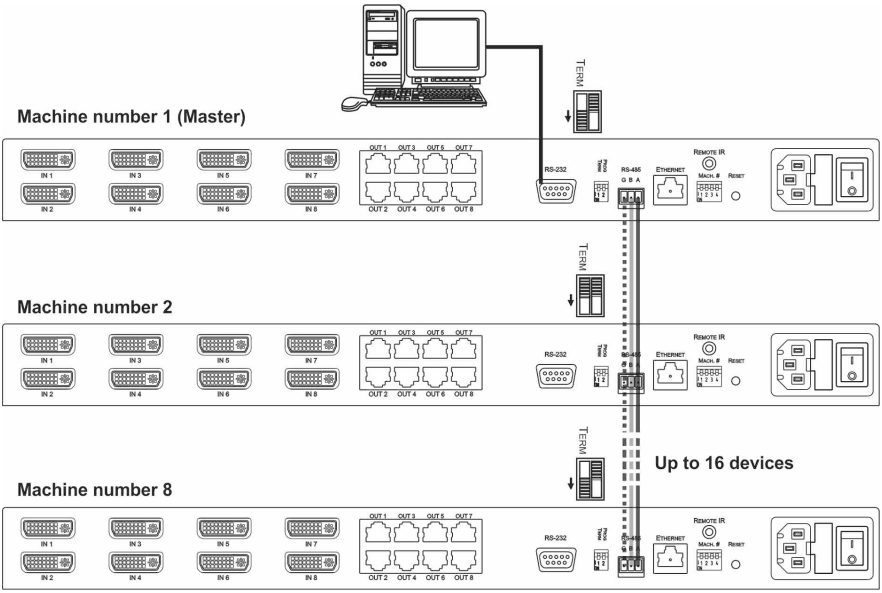


Figure 6: Control of Multiple VS-88DTP Devices via RS-232 and RS-485

1 Alternatively, the RS-485 port could be used for PC control

6.3 Connecting to the VS-88DTP via Ethernet

You can connect the **VS-88DTP** via Ethernet using a crossover cable (see Section 6.3.1) for direct connection to the PC, or a straight-through cable (see Section 6.3.2) for connection via a network hub or network router[1].

6.3.1 Connecting to the Ethernet Port directly to a PC

You can connect the Ethernet port of the **VS-88DTP** to the Ethernet port on your PC, via a crossover cable with RJ-45 connectors.

This type of connection is recommended for identifying the VS-88DTP with the factory configured default IP address

After connecting the Ethernet port, configure your PC as follows:

1. Right-click the **My Network Places** icon on your desktop.
2. Select **Properties**.
3. Right-click Local Area Connection Properties.
4. Select **Properties**.
   The Local Area Connection Properties window appears.
5. Select the Internet Protocol (TCP/IP) and click the **Properties** Button (see Figure 7).

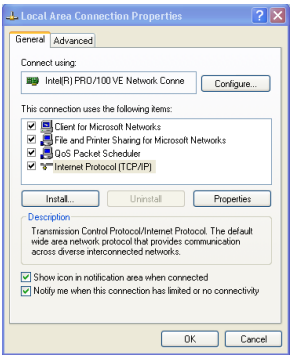


Figure 7: Local Area Connection Properties Window

6. Select Use the following IP Address, and fill in the details as shown in Figure 8.
7. Click **OK**.

1 After connecting the Ethernet port, you have to install and configure your Ethernet Port. For detailed instructions, see the Configuration Guide in the technical support section on our Web site http://www.kramerelectronics.com

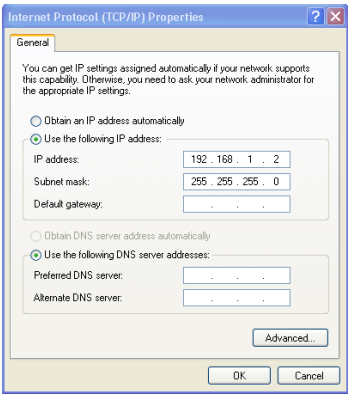

Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
192 . 168 . 1 . 2
Subnet mask:
255 . 255 . 255 . 0
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

Figure 8: Internet Protocol (TCP/IP) Properties Window

6.3.2 Connecting to the Ethernet Port via a Network Hub

You can connect the Ethernet port of the **VS-88DTP** to the Ethernet port on a network hub or network router, via a straight through cable with RJ-45 connectors.

7 Operating the VS-88DTP 8x8 DVI - Twisted Pair Matrix Switcher

This section describes how to:

- Route inputs to outputs (see Section 7.1)
- Disconnect outputs (see Section 7.2)
- Store and recall a setup (see Section 7.3)
- Acquire the EDID (see Section 7.5)

7.1 Routing Inputs to Outputs

To route an input to an output:

1. Press the required OUT key.
2. Press the required IN key.
   The selected input is routed to the output.

To route one input to all outputs:

1. Press ALL.
2. Press the required IN button.
   The selected input is routed to all outputs.

7.2 Disconnecting Outputs

To disconnect one output:

1. Press the required OUT button

2. Press OFF.
   The selected output is disconnected.

To disconnect all outputs at once:

1. Press the ALL button.
2. Press OFF.
   All outputs are disconnected.

7.3 Storing and Recalling Setups in Presets

You can use the STO and RCL buttons to store and recall up to 16 setups in presets. Figure 9 illustrates the preset assignment numbers. Preset 1 is assigned to OUT 1 and preset 16 is assigned to IN 8.

Note: The preset numbers do not appear on the buttons.

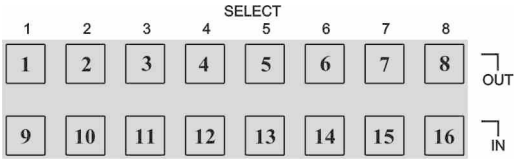


Figure 9: Preset Number Assignments using the Selector Buttons

To store a setup:

1. Route inputs and outputs as required.
2. Press the STO button.
   The STO button flashes.
3. Select a preset number in which to store the current configuration (for example, for preset 13, press IN 5).

To recall a setup:

1. Press the RCL button.
   The RCL button flashes.
2. Press the required preset button (for example, for preset 13, press IN 5).

7.4 Switching between Protocol 2000 and Protocol 3000

To switch to Protocol 2000:

- Press the Output 1 and Output 2 buttons at the same time.
  The device switches to Protocol 2000 and the display shows 2000.

To switch to Protocol 3000:

- Press the Output 1 and Output 3 buttons at the same time.
  The device switches to Protocol 3000 and the display shows 3000.

7.5 Acquiring the EDID

You can acquire the EDID from:

- A single connected output (see Section 7.5.1)
- Several outputs (see Section 7.5.2)
- The default EDID (see Section 7.5.3)

7.5.1 Acquiring an EDID from a Single Output

To acquire or change the EDID from a single output:

1. Connect the acceptor to the required output from which you want to acquire the EDID.
2. Press the EDID button.
   The EDID button flashes.
3. Press the SELECT IN button to which the EDID will be copied.
   The selected input number flashes on the display.
4. Select the SELECT OUT button from which the EDID will be acquired.
5. Press the EDID button.
   The process is complete when the display returns to normal.

7.5.2 Acquiring an EDID from Several Outputs to Several Inputs

To acquire the EDID from several outputs to several inputs (for example, OUT 1 to IN 1 and OUT 6 to IN 3):

1. Connect the acceptors to the required outputs from which you want to acquire the EDIDs.
2. Press the EDID button.
   The EDID buttons flashes.
3. Press the SELECT IN button to which the first EDID will be copied (for example, IN 1).
   The selected input number flashes on the display.
4. Press the SELECT OUT button from which the first EDID will be acquired (for example, OUT 1).
5. Press the SELECT IN 1 button again.
   The IN 1 button ceases to flash.
6. Press another SELECT IN to which the next EDID will be copied (for example, IN 3).
   The selected input number flashes on the display.
7. Press the SELECT OUT button from which the next EDID will be acquired (for example, OUT 6).
8. Press the SELECT IN 3 button again.
   The IN 3 button ceases to flash.

9. Press the SELECT IN buttons to which you want to copy the EDID (for example, IN 1 and IN 3).
10. Make sure that the relevant input numbers flash on the display.
11. Press the EDID button.
    The process is complete when the display returns to normal.

7.5.3 Acquiring the Default EDID

To reset to the default EDID, do the following:

1. Press the EDID button.
   The EDID button flashes.
2. Press the SELECT IN button to which the EDID will be copied.
   The selected input number flashes on the display.
3. Press the OFF button until a "0" (zero) appears on the display.
4. Press the EDID button.
   The process is complete when the display returns to normal.

7.6 Locking and Unlocking the Front Panel Buttons

To lock and unlock the front panel buttons:

1. Press and hold the LOCK button until the buttons lights.
   The front panel buttons are locked.
2. Press and hold the LOCK button until the button no longer lights.
   The front panel buttons are unlocked.

7.7 Control Configuration via the Ethernet Port

To control several units via the Ethernet, connect the Master unit (Machine # 1) via the Ethernet port to the LAN port of your PC. Use your PC initially to configure the settings (see Section 6.3).

8 Controlling the VS-88DTP Remotely via Ethernet

You can remotely operate the **VS-88DTP** using a Web browser via the Ethernet connection (see Section 8.1). To be able to do so, you must use a supported Web browser; Microsoft (V6.0 and higher), Chrome, Firefox (V3.0 and higher).

To check that Java is installed and running, browse to:
http://www.java.com/en/download/help/testvm.xml

This page runs a test and displays a Java success (see Figure 10) or failure message.

Your Java is working
Latest Java installed
Your Java configuration is as follows:
Vendor: Sun Microsystems Inc.
Version: Java 6 Update 21
Operating System: Windows XP 5.1
Architecture: x86

Figure 10: Java Test Page Success Message

If you do not see the success message, follow the instructions on the page to:

- Load and enable Java
- Enable Javascript in your browser

8.1 Connecting to the VS-88DTP via your Browser

Make sure that your PC is connected via a network to the **VS-88DTP** and do the following:

1. Open your Internet browser.
2. Enter the unit's IP number (for the default IP address, see Figure 11) or name in the Address bar of your browser.
   If you are using DHCP, you have to enter the name.

Figure 11: Entering the IP Number in the Address Bar

The Loading page appears.

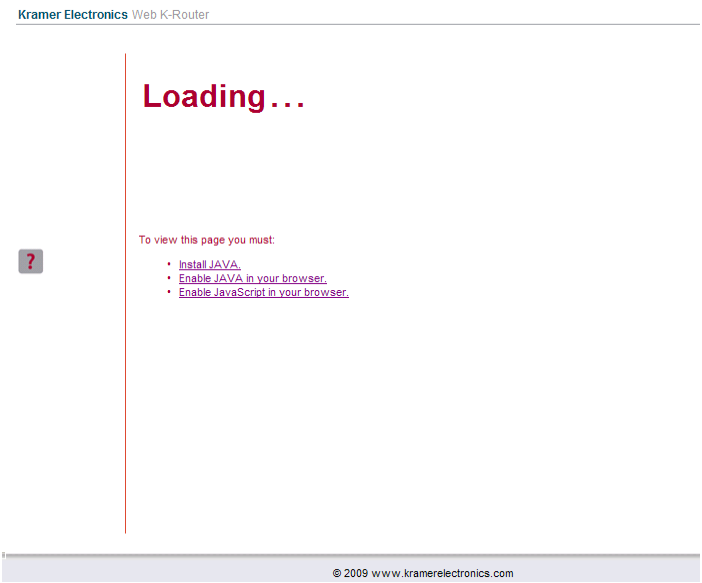


Figure 12: The Loading Page

The first time that you run the Kramer applet a security warning appears.

Warning - Security
The application's digital signature cannot be verified.
Do you want to run the application?
Name: K_Applet
Publisher: Kramer Electronics
From: http://192.168.1.39
Always trust content from this publisher.
Run
Cancel
The digital signature cannot be verified by a trusted source. Only run if you trust the origin of the application.
More Information...

Figure 13: First Time Security Warning

3. Click **Run**.
   The main switching control page is displayed which shows a graphical representation of the front panel (see Figure 14).

There are two remote operation Web pages:

- Main switching matrix (see Section 8.2)
- Configuration (see Section 8.3)

Select a page by clicking on the relevant link on the left hand side of the window.

8.2 The Main Switching Matrix Page

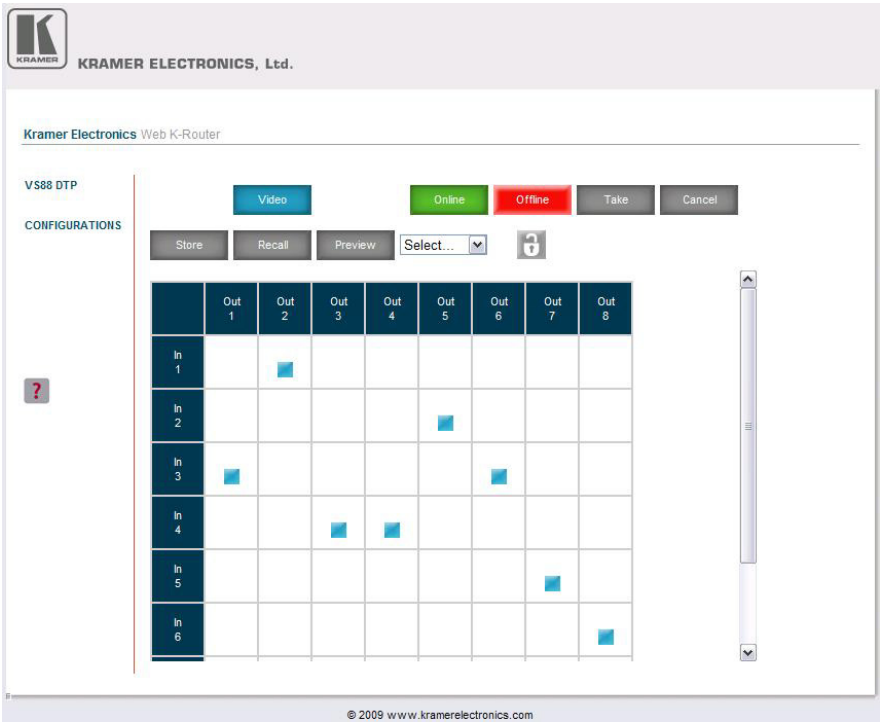


Figure 14: Main Switching Matrix Page

The main switching matrix page allows you to:

- Switch any input to any/all outputs independently (see Section 8.2.1)
- Operate the unit in the Offline mode (see Section 8.2.2)
- Use presets to store and recall switching configurations (see Section 8.2.3)
- Lock or unlock the unit's front panel buttons (see Section 8.2.4)

8.2.1 Switching an Input to an Output

To switch an input to an output, for example, input 1 to output 4:

1. Click the required point within the switching matrix grid (In 1, Out 4).

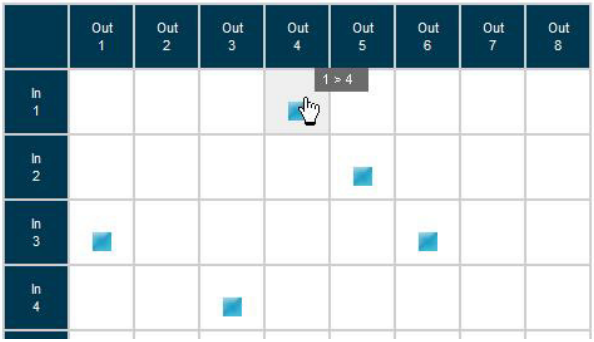


Figure 15: Selecting a Switching Point on the Matrix

A blue switching icon appears indicating that the channel is switched to In 1 and Out 4.

2. Repeat the above steps for each channel that you want to switch.

8.2.2 Operating in the Offline Mode

By default, the unit operates in the At-Once mode, meaning that any switching changes take effect immediately. In the Offline mode, changes only take effect when you press the **Take** button.

To operate in the Offline mode:

1. Click the red **Offline** button.
   The button outline becomes dark.
2. Click the required point in the switching matrix grid (In 1, Out 5).

   The switching icon outline appears, and the **Take** and **Cancel** buttons change from gray to dark blue.

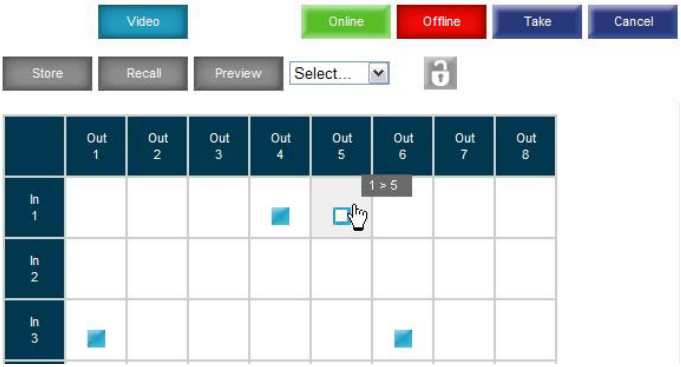


Figure 16: Switching in the Offline Mode

3. If required, repeat Step 2 for several channels.

4. Click either **Take** to accept the change or **Cancel**.
5. Click the **Online** button to exit the Offline mode.

8.2.3 Storing and Recalling Setups

You can store switching configurations in presets and recall them at any time.

To store a switching configuration:

1. From the Preset drop-down list, select a preset (in this example, Preset 07).
   Presets that contain a configuration are displayed with a blue background; presets with no configuration have a white background. When you select a preset, the **Store** button changes from gray to dark blue.

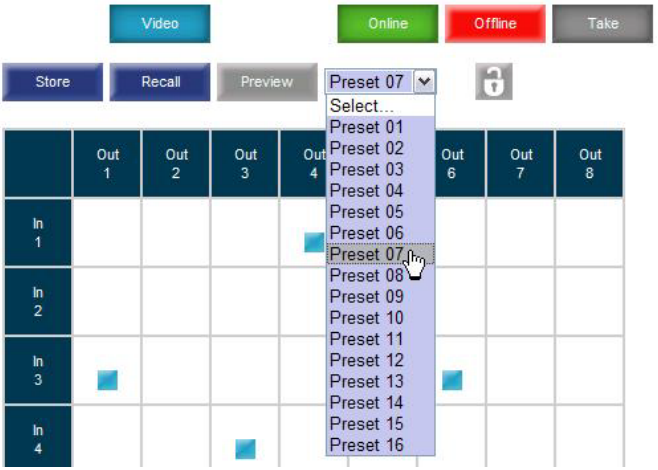


Figure 17: Selecting Preset 07

2. Click **Store**.
   A confirmation message appears.
3. Click **OK**.
   The configuration is stored in Preset 07.

To recall a setup:

1. From the Preset drop-down list, select a preset (in this example, Preset 03).
   Presets that contain a configuration are displayed with a blue background; presets with no configuration have a white background. When you select a preset that contains a configuration, the **Recall** button changes from gray to dark blue.

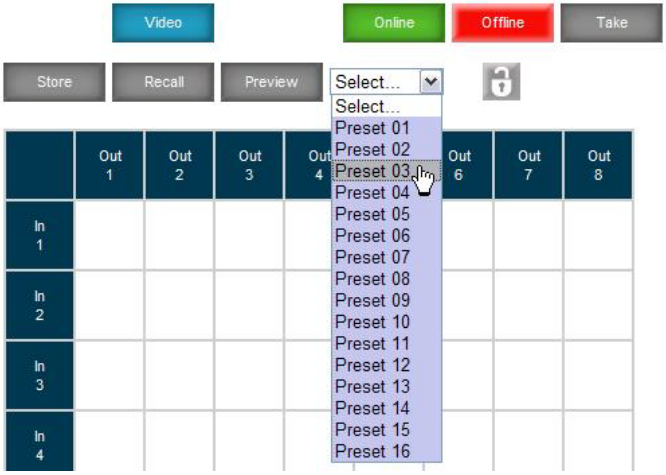


Figure 18: Selecting Preset 03

2. Click **Recall**.
   A confirmation message appears.
3. Click **OK**.
   The configuration from Preset 03 is loaded.

Note: You can also recall a preset in the Offline mode (see Figure 19) and make it active when you press the **Take** button (see Section 8.2.2).

Figure 19: Recalling a Preset in Offline Mode

8.2.4 Locking the Front Panel Buttons

You can lock the front panel buttons to prevent tampering.

To lock the front panel buttons:

- Click the padlock icon

Note: Locking the front panel buttons does not disable remote operation of the unit via Ethernet, RS-232 or RS-485.

8.3 The Configuration Page

The Configuration page lets you edit the IP-related settings and only view the others. Editable fields have a white background.

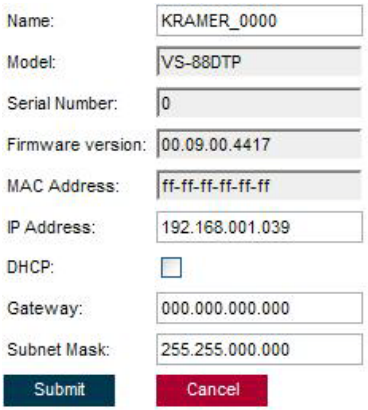


Figure 20: Configuration Page

The following IP-related settings can be edited:

- Machine name
- Fixed IP Address/DHCP
- Gateway
- Subnet Mask

The following fields can be viewed:

- Model
- Serial Number
- Firmware Version
- MAC Address

To edit the IP-related settings:

1. Edit the required field.
2. Click **Submit**.
   The Network Settings confirmation message appears.

3. Click **OK**.
   A message appears showing that the settings have been successfully changed.
4. If the IP address was changed or you selected DHCP, reload the Web page using the new name or IP address.

9 Technical Specifications

Table 4 lists the technical specifications for the **VS-88DTP**.

Table 4: VS-88DTP Technical Specifications[1]

INPUTS:	8 DVI connectors
OUTPUTS:	8 TP on RJ-45 connectors
BANDWIDTH:	Up to 1.65Gbps bandwidth per graphic channel
COMPLIANCE WITH STANDARDS:	Supports DVI 1.1
MAX RESOLUTION:	Up to UXGA; 1080p, 1920 x 1200
POWER SOURCE:	100–240VAC; 50/60Hz, 55VA
CONTROLS:	Front panel buttons, Infrared remote control transmitter, RS-232, RS-485, Ethernet
OPERATING TEMPERATURE:	0° to +55°C (32° to 131°F)
STORAGE TEMPERATURE:	-45° to +72°C (-49° to 162°F)
HUMIDITY:	10% to 90%, RHL non-condensing
DIMENSIONS:	19" x 9.7" x 1U (W, D, H)
WEIGHT:	2.3kg (5.5lbs) approx.
ACCESSORIES:	Power cord, IR transmitter, Rack “ears”
OPTIONS:	Kramer cables[2]; external remote IR receiver cable

10 Default Communication Parameters

Table 5: Default Communication Parameters

EDID			
EDID data is passed between Output 1 and Input 1			
RS-232			
Protocol 2000		**Protocol 3000 (Default)**	
Baud Rate:	9600	Baud Rate:	115,200
Data Bits:	8	Data Bits:	8
Stop Bits:	1	Stop Bits:	1
Parity:	None	Parity:	None
Command Format:	HEX	Command Format:	ASCII
Example (Output 1 to Input 1):	0x01, 0x81, 0x81, 0x81	Example (Output 1 to Input 1):	#AV 1>1<CR>

1 Specifications are subject to change without notice

2 For best results, use Kramer cables such as the C-DM-DM series

Switching Protocol			
P2000 -> P3000		**P3000 -> P2000**	
Command:	0x38, 0x80, 0x83, 0x81	Command:	#P2000<CR>

Ethernet	
Default Settings	**Reset Settings**
IP Address: 192.168.1.39	Power cycle the unit while holding in the Factory Reset button, located on the rear panel of the unit.
TCP Port #: 5000	
UDP Port #: 50000	

The Windows®-based Kramer control software[1] operates with protocol 2000. If the **VS-88DTP** is set to protocol 3000, it is automatically switched to protocol 2000.

11 Default EDID

Each input on the **VS-88DTP** is loaded with a factory default EDID. The EDID for each input can be changed independently by uploading an EDID binary file to each input via the RS-232 port using Kramer EDID Sender software[2].

```
Monitor
  Model name..... VS-88DTP
  Manufacturer..... KRM
  Plug and Play ID..... KRM0200
  Serial number..... 1
  Manufacture date..... 2006, ISO week 12
  ------------------------
  EDID revision..... 1.3
  Input signal type..... Digital (DVI)
  Color bit depth..... Undefined
  Display type..... RGB color
  Screen size..... 700 x 390 mm (31.5 in)
  Power management..... Not supported
  Extension blocs..... None
  ------------------------
  DDC/CI..... n/a

Color characteristics
  Default color space..... Non-sRGB
  Display gamma..... 2.20
  Red chromaticity..... Rx 0.640 - Ry 0.341
  Green chromaticity..... Gx 0.286 - Gy 0.610
  Blue chromaticity..... Bx 0.146 - By 0.069
  White point (default).... Wx 0.284 - Wy 0.293
  Additional descriptors... None

Timing characteristics
  Horizontal scan range.... 45-56kHz
  Vertical scan range..... 86-83Hz
  Video bandwidth..... 560MHz
  CVT standard..... Not supported
  GTF standard..... Not supported
```

1 Download the latest software from our Web site at http://www.kramerelectronics.com

2 Available for download from http://www.kramerelectronics.com

```
Additional descriptors... None
Preferred timing..... Yes
Native/preferred timing.. 1280x768p at 60Hz (4:3)
  Modeline..... "1280x768" 79.500 1280 1344 1472 1664 768 771 778 798 +hsync +vsync
Detailed timing #1..... 1920x1200p at 60Hz (16:10)
  Modeline..... "1920x1200" 154.000 1920 1968 2000 2080 1200 1203 1209 1235 +hsync -vsync

Standard timings supported
    720 x  400p at  70Hz - IBM VGA
    720 x  400p at  88Hz - IBM XGA2
    640 x  480p at  60Hz - IBM VGA
    640 x  480p at  67Hz - Apple Mac II
    640 x  480p at  72Hz - VESA
    640 x  480p at  75Hz - VESA
    800 x  600p at  56Hz - VESA
    800 x  600p at  60Hz - VESA
    800 x  600p at  72Hz - VESA
    800 x  600p at  75Hz - VESA
    832 x  624p at  75Hz - Apple Mac II
   1024 x  768i at  87Hz - IBM
   1024 x  768p at  60Hz - VESA
   1024 x  768p at  70Hz - VESA
   1024 x  768p at  75Hz - VESA
   1280 x 1024p at  75Hz - VESA
   1152 x  870p at  75Hz - Apple Mac II
   1360 x  765p at  60Hz - VESA STD
   1280 x  800p at  60Hz - VESA STD
   1440 x  900p at  60Hz - VESA STD
   1280 x  960p at  60Hz - VESA STD
   1280 x 1024p at  60Hz - VESA STD
   1400 x 1050p at  60Hz - VESA STD
   1680 x 1050p at  60Hz - VESA STD
   1600 x 1200p at  60Hz - VESA STD

Report information
  Date generated..... 21-Jun-11
  Software revision..... 2.53.0.861
  Data source..... File
  Operating system..... 5.1.2600.2.Service Pack 3

Raw data
  00,FF,FF,FF,FF,FF,FF,00,2E,4D,00,02,01,00,00,00,0C,10,01,03,81,46,27,78,0A,D5,7C,A3,57,49,9C,25,
  11,48,4B,FF,FF,80,8B,C0,81,00,95,00,81,40,81,80,90,40,B3,00,A9,40,0E,1F,00,80,51,00,1E,30,40,80,
  37,00,6F,13,11,00,00,1E,28,3C,80,A0,70,B0,23,40,30,20,36,00,06,44,21,00,00,1A,00,00,00,FC,00,56,
  53,2D,38,38,44,54,50,0A,20,20,20,20,00,00,00,FD,00,56,53,2D,38,38,44,54,50,0A,20,20,20,20,00,83
```

12 Updating the VS-88DTP Firmware

Instructions for upgrading the **VS-88DTP** firmware can be found at http://www.kramerelectronics.com.

13 Table of ASCII Codes for Serial Communication (Protocol 3000)

Table 6 lists the ASCII codes that switch an input to an output for a single **VS-88DTP** machine. For more detailed information, see Section 15.2.

Table 6: VS-88DTP Video Signal Codes for Protocol 3000

	OUT 1	OUT 2	OUT 3	OUT 4	OUT 5	OUT 6	OUT 7	OUT 8
IN 1	#V 1>1 CR	#V 1>2 CR	#V 1>3 CR	#V 1>4 CR	#V 1>5 CR	#V 1>6 CR	#V 1>7 CR	#V 1>8 CR
IN 2	#V 2>1 CR	#V 2>2 CR	#V 2>3 CR	#V 2>4 CR	#V 2>5 CR	#V 2>6 CR	#V 2>7 CR	#V 2>8 CR
IN 3	#V 3>1 CR	#V 3>2 CR	#V 3>3 CR	#V 3>4 CR	#V 3>5 CR	#V 3>6 CR	#V 3>7 CR	#V 3>8 CR

	OUT 1	OUT 2	OUT 3	OUT 4	OUT 5	OUT 6	OUT 7	OUT 8
IN 4	#V 4>1 CR	#V 4>2 CR	#V 4>3 CR	#V 4>4 CR	#V 4>5 CR	#V 4>6 CR	#V 4>7 CR	#V 4>8 CR
IN 5	#V 5>1 CR	#V 5>2 CR	#V 5>3 CR	#V 5>4 CR	#V 5>5 CR	#V 5>6 CR	#V 5>7 CR	#V 5>8 CR
IN 6	#V 6>1 CR	#V 6>2 CR	#V 6>3 CR	#V 6>4 CR	#V 6>5 CR	#V 6>6 CR	#V 6>7 CR	#V 6>8 CR
IN 7	#V 7>1 CR	#V 7>2 CR	#V 7>3 CR	#V 7>4 CR	#V 7>5 CR	#V 7>6 CR	#V 7>7 CR	#V 7>8 CR
IN 8	#V 8>1 CR	#V 8>2 CR	#V 8>3 CR	#V 8>4 CR	#V 8>5 CR	#V 8>6 CR	#V 8>7 CR	#V 8>8 CR

14 Hex Codes for Serial Communication (Protocol 2000)

The Hex codes listed in this section are used to set video channels for a single machine (set as Machine 1) connected via either RS-232 or Ethernet. Similar hex codes are used when the **VS-88DTP** is connected via RS-485 and the machine is set to number 2.

Table 7 lists the Hex codes that switch video channels:

Table 7: VS-88DTP Hex Codes for Switching via RS-232/RS-485

	Switching Video Channels							
	OUT 1	OUT 2	OUT 3	OUT 4	OUT 5	OUT 6	OUT 7	OUT 8
IN 1	01 81 81 81	01 81 82 81	01 81 83 81	01 81 84 81	01 81 85 81	01 81 86 81	01 81 87 81	01 81 88 81
IN 2	01 82 81 81	01 82 82 81	01 82 83 81	01 82 84 81	01 82 85 81	01 82 86 81	01 82 87 81	01 82 88 81
IN 3	01 83 81 81	01 83 82 81	01 83 83 81	01 83 84 81	01 83 85 81	01 83 86 81	01 83 87 81	01 83 88 81
IN 4	01 84 81 81	01 84 82 81	01 84 83 81	01 84 84 81	01 84 85 81	01 84 86 81	01 84 87 81	01 84 88 81
IN 5	01 85 81 81	01 85 82 81	01 85 83 81	01 85 84 81	01 85 85 81	01 85 86 81	01 85 87 81	01 85 88 81
IN 6	01 86 81 81	01 86 82 81	01 86 83 81	01 86 84 81	01 86 85 81	01 86 86 81	01 86 87 81	01 86 88 81
IN 7	01 87 81 81	01 87 82 81	01 87 83 81	01 87 84 81	01 87 85 81	01 87 86 81	01 87 87 81	01 87 88 81
IN 8	01 88 81 81	01 88 82 81	01 88 83 81	01 88 84 81	01 88 85 81	01 88 86 81	01 88 87 81	01 88 88 81

15 Kramer Protocol

By default, the **VS-88DTP** is set to protocol 3000 (see Section 15.2) but is also compatible with Kramer's Protocol 2000[1] (see Section 15.3). Section 15.1 describes how to switch between protocol 3000 and protocol 2000.

15.1 Switching Protocols

You can switch protocols either via the front panel buttons (see Section 15.1.1) or the protocol commands.

15.1.1 Switching Protocols via the Front Panel Buttons

To switch from protocol 3000 to protocol 2000, press and hold[2] the OUT 1 and OUT 2 buttons for a few seconds.

1 You can download our user-friendly "Software for Calculating Hex Codes for Protocol 2000" from the technical support section on our Web site at: http://www.kramerelectronics.com

2 Not as part of a switching operation

The display shows 2000.

To switch from protocol 2000 to protocol 3000, press and hold the OUT 1 and OUT 3 buttons for a few seconds.
The display shows 3000.

15.2 Kramer Protocol 3000

This RS-232/RS-485 communication protocol lets you control the machine from any standard terminal software (for example, Windows® HyperTerminal).

15.2.1 Host Message Format

Start	Address (optional)	Body	Delimiter
#	*Destination_id*@	**Message**	CR

15.2.1.1 Simple Command

Command string with only one command without addressing:

Start	Body	Delimiter
#	**Command** SP *Parameter_1,Parameter_2,…*	CR

15.2.1.2 Command String

Formal syntax with commands concatenation and addressing:

Start	Address	Body	Delimiter
#	*Destination_id*@	**Command_1** *Parameter1_1,Parameter1_2,…*| **Command_2** *Parameter2_1,Parameter2_2,…*| **Command_3** *Parameter3_1,Parameter3_2,…*|…	CR

15.2.2 Device Message Format

Start	Address (optional)	Body	delimiter
~	*Sender_id*@	**Message**	CR LF

15.2.2.1 Device Long Response

Echoing command:

Start	Address (optional)	Body	Delimiter
~	*Sender_id*@	**Command** SP [*Param1 ,Param2 …*] **result**	CR LF

CR = Carriage return (ASCII 13 = 0x0D)
LF = Line feed (ASCII 10 = 0x0A)
SP = Space (ASCII 32 = 0x20)

15.2.3 Command Terms

Command
A sequence of ASCII letters ('A'-'Z', 'a'-'z' and '-').
Command and parameters must be separated by at least one space.

Parameters
A sequence of alphameric ASCII characters ('0'-'9','A'-'Z','a'-'z' and some special characters for specific commands). Parameters are separated by commas.

Message string
Every command entered as part of a message string begins with a **message starting character** and ends with a **message closing character**.
Note: A string can contain more than one command. Commands are separated by a pipe ('|') character.

Message starting character
'#' – For host command/query
'~' – For machine response

Device address (Optional when directly connected to the device)
K-NET Device ID or MACHINE NUMBER followed by '@'
(ex. #02@CRLF)

Query sign
'?' follows some commands to define a query request.

All outputs sign
'*' defines all outputs.

Message closing character
CR – For host messages; carriage return (ASCII 13)
CRLF – For machine messages; carriage return (ASCII 13) + line-feed (ASCII 10)

Command chain separator character
When a message string contains more than one command, a pipe ('|') character separates each command.

Spaces between parameters or command terms are ignored.

15.2.4 Entering Commands

You can directly enter all commands using a terminal with ASCII communications software, such as HyperTerminal, Hercules, etc. Connect the terminal to the serial, Ethernet, or USB port on the Kramer device. To enter **CR** , press the Enter key.
(**LF** is also sent but is ignored by command parser).

For commands sent from some non-Kramer controllers like Crestron, some characters require special coding (such as, /X##). Refer to the controller manual.

15.2.5 Command Forms

Some commands have short name syntax in addition to long name syntax to allow faster typing. The response is always in long syntax.

15.2.6 Command Chaining

Multiple commands can be chained in the same string. Each command is delimited by a pipe character ('|'). When chaining commands, enter the **message starting character** and the **message closing character** only once, at the beginning of the string and at the end.

Commands in the string do not execute until the closing character is entered.

A separate response is sent for every command in the chain.

15.2.7 Maximum String Length

64 characters

15.2.8 Backward Support

You can switch between protocols using a switch protocol command from either platform.

Table 8: Instruction Codes for Protocol 3000

Help commands		
Command	**Syntax**	**Response**
Protocol Handshaking	#CR	~OK**CRLF**

Device initiated messages	
Command	**Syntax**
Start message	~Protocol start **CRLF**
Switcher actions	
Video channel has switched (AFV mode)	**AV** *IN>OUT*

Result codes (errors)	
	Syntax
No error. Command running succeeded	COMMAND PARAMETERS **OK**
Protocol Errors	
Syntax Error	**ERR001**
Command not available for this device	**ERR002**
Parameter is out of range	**ERR003**
Unauthorized access (running command without the match login).	**ERR004**

Basic routing commands		
Command	**Syntax**	**Response**
Switch video	**AV** *IN*>*OUT*, *IN*>*OUT*, …	**AV** *IN*>*OUT*, *IN*>*OUT*,…*RESULT*
OR		
Switch video only	**VID** *IN*>*OUT*, *IN*>*OUT*, … **Short form**: **V** *IN*>*OUT*, *IN*>*OUT*, …	**AV** *IN*>*OUT*, *IN*>*OUT*, …*RESULT*
Note: When AFV mode is active, this command will switch also audio. If audio is breakaway – device display mode will change to show audio connections status.		

Basic routing commands		
Note: When AFV mode is active, this command will switch also video.		
Read video connection	**VID?** *OUT* **Short form**: **V?** *OUT* **VID? ***	**VID** *IN>OUT* **VID** *IN*>**1**, *IN*>**2**, …

Parameters Description:
IN = Input number or '0' to disconnect output.
'>' = Connection character between in and out parameters.
OUT = Output number or '*' for all outputs.

Examples:		
Switch Video and Audio input 3 to output 7	#AV 3>7**CR**	~AV 3>7 OK**CRLF**
Switch Video input 2 to output 4	#V 2>4**CR**	~AV 2>4 OK**CRLF**
Switch Video input 4 to output 2 in machine number 6	#6@VID 4>2**CR**	~6@AV 4>2 OK**CRLF**
Disconnect Video and Audio Output 4	#AV 0>4**CR**	~AV 0>4 OK**CRLF**
Switch Video Input 3 to All Outputs	#V 3>***CR**	~AV 3>* OK**CRLF**
Chaining Multiple commands*	#AV 1>* | V 3>4, 2>2, 82>1, 0>2 |V 82>3| V? * **CR** First switch all Audio and video outputs from input 1, **Then switch video input 3 to output 4, video input 2 to output 2, video input and disconnect video output 2.** Then switch audio input 3 to output 2, Then disconnect audio output 1. Then get status of all links (assume this is 4x4 matrix). Commands processing start after entering **CR**, response will sent for each command after processing it.	~AV 1>* OK**CRLF** ~AV 1>2, 3>4 OK**CRLF** ~AV 82>3 **ERR###** **CRLF** ~AUD 0>1 OK**CRLF** ~AV 1>1, 0>2, 1>3, 3>4 **CRLF**

Preset commands		
Command	**Syntax**	**Response**
Store current connections to preset	**PRST-STO** *PRESET* **Short form**: **PSTO** *PRESET*	**PRST-STO** *PRESET* *RESULT*
Recall saved preset	**PRST-RCL** *PRESET* **Short form: PRCL** *PRESET*	**PRST-RCL** *PRESET* *RESULT*
Read video connections from saved preset	**PRST-VID?** *PRESET*,*OUT* **Short form: PVID?** *PRESET*,*OUT* **PRST-VID?** *PRESET*, *	**PRST-VID** *PRESET*, *IN*>*OUT* **PRST-VID** *PRESET*, *IN*>*1*, *IN*>2,…

Parameters Description:
PRESET = Preset number.
OUT = Output in preset to show for, '*' for all.

Examples:		
Store current Audio & Video connections to preset 5	#PRST-STR 5**CR**	~PRST-STR 5 OK**CRLF**

Recall Audio & Video connections from preset 3	#PRCL 3**CR**	~PRST-RCL 3 OK**CRLF**
Show source of video output 2 from preset 3	#PRST-VID? 3,2**CR**	~PRST-VID 3: 4>2 **CRLF**

Operation commands		
Command	**Syntax**	**Response**
Lock front panel	**LOCK-FP** *LOCK-MODE* **Short form: LCK** *LOCK-MODE*	**LOCK-FP** *LOCK-MODE* *RESULT*
Get front panel locking state	**LOCK-FP?**	**LOCK-FP** *LOCK-MODE*
Parameters Description: **LOCK-MODE** = Front panel locking state: "0" or "off" to unlock front panel buttons. "1" or "on" to lock front panel buttons.		
Restart device	**RESET**	**RESET OK**
Switch to protocol 2000*	**P2000**	**P2000 OK**
* Protocol 2000 has command to switch back to ASCII protocol (like protocol 3000)		

Machine info commands		
Command	**Syntax**	**Response**
* Time settings commands require admin authorization		
Read in\outs count	**INFO-IO?**	**INFO-IO: IN** *INPUTS_COUNT*, **OUT** *OUTPUTS_COUNT*
Read max presets count	**INFO-PRST?**	**INFO-PRST: VID** *PRESET_VIDEO_COUNT*, **AUD** *PRESET_AUDIO_COUNT*
Reset configuration to factory default	**FACTORY**	**FACTORY** *RESULT*

Identification commands		
Command	**Syntax**	**Response**
Protocol Handshaking	#**CR**	**~OK CRLF**
Read device model	**MODEL?**	**MODEL** *MACHINE_MODEL*
Read device serial number	**SN?**	**SN** *SERIAL_NUMBER*
Read device firmware version	**VERSION?**	**VERSION** *MAJOR* .*MINOR* .*BUILD* .*REVISION*
Set machine name	**NAME** *MACHINE_NAME*	**NAME** *MACHINE_NAME* *RESULT*
Read machine name	**NAME?**	**NAME** *MACHINE_NAME*
Reset machine name to factory default*	**NAME-RST**	**NAME-RST** *MACHINE_FACTORY_NAME* *RESULT*
*Note: machine name not equal to model name. This name relevance for site viewer identification of specific machine or for network using (with DNS feature on).		

Identification commands		
Command	**Syntax**	**Response**
MACHINE_NAME = Up to 14 Alfa-Numeric chars. * **Machine factory name =** Model name + last 4 digits from serial number.		

Network settings commands		
Set IP Address	**NET-IP** *IP_ADDRESS* **NTIP**	**NET-IP** *IP_ADDRESS* *RESULT*
Read IP Address	**NET-IP?** **NTIP**?	**NET-IP** *IP_ADDRESS*
Read MAC Address	**NET-MAC?** **NTMC**	**NET-MAC** *MAC_ADDRESS*
Set subnet mask	**NET-MASK** *SUBNET_MASK* **NTMSK**	**NET-MASK** *SUBNET_MASK* *RESULT*
Read subnet mask	**NET-MASK?** **NTMSK?**	**NET-MASK** *SUBNET_MASK*
Set gateway address	**NET-GATE** *GATEWAY_ADDRESS* **NTGT**	**NET-GATE** *GATEWAY_ADDRESS* *RESULT*
Read subnet mask	**NET-GATE?** **NTGT?**	**NET-GATE** *GATEWAY_ADDRESS*
Set DHCP mode	**NET-DHCP** *DHCP_MODE* **NTDH**	**NET-DHCP** *DHCP_MODE* *RESULT*
Read subnet mask	**NET-DHCP?** **NTDH?**	**NET-DHCP** *DHCP_MODE*
DHCP_MODE = 0 – Don't use DHCP (Use IP set by factory or IP set command). 1 – Try to use DHCP, if unavailable use IP as above.		
Change protocol ethernet port	**ETH-PORT** *PROTOCOL* , *PORT* **ETHP**	**ETH-PORT** *PROTOCOL* , *PORT* *RESULT*
Read protocol ethernet port	**ETH-PORT?** *PROTOCOL* **ETHP?**	**ETH-PORT** *PROTOCOL* , *PORT*
PROTOCOL = TCP / UDP (transport layer protocol) *PORT* = ethernet port to enter protocol 3000 commands. 1-65535 = User defined port 0 - reset port to factory default (50000 for UDP, 5000 for TCP)		

15.3 Kramer Protocol 2000

This RS-232/RS-485 communication protocol uses four bytes of information as defined below. The default data rate is 115200 baud, with no parity, 8 data bits and 1 stop bit.

Table 9: Protocol Definitions

MSB							LSB
	DESTI-NATION	**INSTRUCTION**					
0	D	N5	N4	N3	N2	N1	N0
7	6	5	4	3	2	1	0
1st byte							
	INPUT						
1	I6	I5	I4	I3	I2	I1	I0
7	6	5	4	3	2	1	0
2nd byte							
	OUTPUT						
1	O6	O5	O4	O3	O2	O1	O0
7	6	5	4	3	2	1	0
3rd byte							
			MACHINE NUMBER				
1	OVR	X	M4	M3	M2	M1	M0
7	6	5	4	3	2	1	0
4th byte							

1st BYTE: Bit 7 – Defined as 0.
D – "DESTINATION": 0 - for sending information to the switchers (from the PC);
1 - for sending to the PC (from the switcher).
N5…N0 – "INSTRUCTION"
The function that is to be performed by the switcher(s) is defined by the INSTRUCTION (6 bits). Similarly, if a function is performed via the machine's keyboard, then these bits are set with the INSTRUCTION NO., which was performed. The instruction codes are defined according to the table below (INSTRUCTION NO. is the value to be set for N5…N0).

2nd BYTE: Bit 7 – Defined as 1.
I6…I0 – "INPUT".
When switching (ie. instruction codes 1 and 2), the INPUT (7 bits) is set as the input number which is to be switched. Similarly, if switching is done via the machine's front-panel, then these bits are set with the INPUT NUMBER which was switched. For other operations, these bits are defined according to the table.

3rd BYTE: Bit 7 – Defined as 1.
O6…O0 – "OUTPUT".
When switching (ie. instruction codes 1 and 2), the OUTPUT (7 bits) is set as the output number which is to be switched. Similarly, if switching is done via the machine's front-panel, then these bits are set with the OUTPUT NUMBER which was switched. For other operations, these bits are defined according to the table.

4th BYTE: Bit 7 – Defined as 1.
Bit 5 – Don't care.
OVR – Machine number override.
M4…M0 – MACHINE NUMBER.
Used to address machines in a system via their machine numbers. When several machines are controlled from a single serial port, they are usually configured together with each machine having an individual machine number. If the OVR bit is set, then all machine numbers will accept (implement) the command, and the addressed machine will reply.
For a single machine controlled via the serial port, always set M4…M0 = 1, and make sure that the machine itself is configured as MACHINE NUMBER = 1.

Table 10: Instruction Codes for Protocol 2000

Note: All values in the table are decimal, unless otherwise stated.

INSTRUCTION		DEFINITION FOR SPECIFIC INSTRUCTION		NOTE
#	DESCRIPTION	INPUT	OUTPUT	
0	RESET VIDEO	0	0	1
1	SWITCH VIDEO	Set equal to video input which is to be switched (0 = disconnect)	Set equal to video output which is to be switched (0 = to all the outputs)	2
3	STORE VIDEO STATUS	Set as SETUP #	0 - to store 1 - to delete	2, 3
4	RECALL VIDEO STATUS	Set as SETUP #	0	2, 3
5	REQUEST STATUS OF A VIDEO OUTPUT	Set as SETUP #	Equal to output number whose status is reqd	4, 3
15	REQUEST WHETHER SETUP IS DEFINED / VALID INPUT IS DETECTED	SETUP # or Input #	0 - for checking if setup is defined 1 - for checking if input is valid	8
16	ERROR / BUSY	For invalid / valid input (i.e. OUTPUT byte = 4 or OUTPUT byte = 5), this byte is set as the input #	0 - error 1 - invalid instruction 2 - out of range 3 - machine busy 4 - invalid input 5 - valid input 6 - RX buffer overflow	9, 25
30	LOCK FRONT PANEL	0 - Panel unlocked 1 - Panel locked	0	2
31	REQUEST WHETHER PANEL IS LOCKED	0	0	16
56	CHANGE TO ASCII	0	Kramer protocol 3000	19
61	IDENTIFY MACHINE	1 - video machine name 2 - audio machine name 3 - video software version 4 - audio software version	0 - Request first 4 digits 1 - Request first suffix 2 - Request second suffix 3 - Request third suffix 10 - Request first prefix 11 - Request second prefix 12 - Request third prefix	13
62	DEFINE MACHINE	1 - number of inputs 2 - number of outputs 3 - number of setups	1 - for video 2 - for audio	14

NOTES on the above table:

NOTE 1 - When the master switcher is reset, (e.g. when it is turned on), the reset code is sent to the PC. If this code is sent to the switchers, it will reset according to the present power-down settings.

NOTE 2 - These are bi-directional definitions. That is, if the switcher receives the code, it will perform the instruction; and if the instruction is performed (due to a keystroke operation on the front panel), then these codes are sent. For example, if the HEX code

01 85 88 83

was sent from the PC, then the switcher (machine 3) will switch input 5 to output 8. If the user switched input 1 to output 7 via the front panel keypad, then the switcher will send HEX codes:

41 81 87 83

to the PC.

When the PC sends one of the commands in this group to the switcher, then, if the instruction is valid, the switcher replies by sending to the PC the same four bytes that it was sent (except for the first byte, where the DESTINATION bit is set high).

NOTE 3 - SETUP # 0 is the present setting. SETUP # 1 and higher are the settings saved in the switcher's memory, (i.e. those used for Store and Recall).

NOTE 4 - The reply to a "REQUEST" instruction is as follows: the same instruction and INPUT codes as were sent are returned, and the OUTPUT is assigned the value of the requested parameter. The replies to instructions 10 and 11 are as per the definitions in instructions 7 and 8 respectively. For example, if the present status of machine number 5 is breakaway setting, then the reply to the HEX code

0B 80 80 85

would be HEX codes

4B 80 81 85

NOTE 6 – If INPUT is set to 127 for these instructions, then, if the function is defined on this machine, it replies with OUTPUT=1. If the function is not defined, then the machine replies with OUTPUT=0, or with an error (invalid instruction code).

If the INPUT is set to 126 for these instructions, then, if possible, the machine will return the current setting of this function, even for the case that the function is not defined. For example, for a video switcher which always switches during the VIS of input #1, (and its VIS setting cannot be programmed otherwise), the reply to the HEX code

0A FE 80 81 (ie. request VIS setting, with INPUT set as 126dec)

would be HEX codes

4A FE 81 81 (ie. VIS setting = 1, which is defined as VIS from input #1).

NOTE 8 - The reply is as in TYPE 3 above, except that here the OUTPUT is assigned with the value 0 if the setup is not defined / no valid input is detected; or 1 if it is defined / valid input is detected.

NOTE 9 - An error code is returned to the PC if an invalid instruction code was sent to the switcher, or if a parameter associated with the instruction is out of range (e.g. trying to save to a setup greater than the highest one, or trying to switch an input or output greater than the highest one defined). This code is also returned to the PC if an RS-232 instruction is sent while the machine is being programmed via the front panel. Reception of this code by the switcher is not valid.

NOTE 13 - This is a request to identify the switcher/s in the system. If the OUTPUT is set as 0, and the INPUT is set as 1, 2, 5 or 7, the machine will send its name. The reply is the decimal value of the INPUT and OUTPUT. For example, for a 2216, the reply to the request to send the audio machine name would be (HEX codes):

7D 96 90 81 (i.e. 128dec+ 22dec for 2nd byte, and 128dec+ 16dec for 3rd byte).

If the request for identification is sent with the INPUT set as 3 or 4, the appropriate machine will send its software version number. Again, the reply would be the decimal value of the INPUT and OUTPUT - the INPUT representing the number in front of the decimal point, and the OUTPUT representing the number after it. For example, for version 3.5, the reply to the request to send the version number would be (HEX codes):

7D 83 85 81 (i.e. 128dec+ 3dec for 2nd byte, 128dec+ 5dec for 3rd byte).

If the OUTPUT is set as 1, then the ASCII coding of the lettering following the machine's name is sent. For example, for the VS-7588YC, the reply to the request to send the first suffix would be (HEX codes):

7D D9 C3 81 (i.e. 128dec+ ASCII for "Y"; 128dec+ ASCII for "C").

NOTE 14 - The number of inputs and outputs refers to the specific machine which is being addressed, not to the system. For example, if six 16X16 matrices are configured to make a 48X32 system (48 inputs, 32 outputs), the reply to the HEX code

3E 82 81 82 (ie. request the number of outputs)

would be HEX codes

7E 82 90 82

ie. 16 outputs

NOTE 16 - The reply to the "REQUEST WHETHER PANEL IS LOCKED" is as in NOTE 4 above, except that here the OUTPUT is assigned with the value 0 if the panel is unlocked, or 1 if it is locked.

NOTE 19 – After this instruction is sent, the unit will respond to the ASCII command set defined by the OUTPUT byte. The ASCII command to operate with the HEX command set must be sent in order to return to working with HEX codes.

NOTE 25 – For units which detect the validity of the video inputs, Instruction 16 will be sent whenever the unit detects a change in the state of an input (in real-time).

For example, if input 3 is detected as invalid, the unit will send the HEX codes

10 83 84 81

If input 7 is detected as valid, then the unit will send HEX codes

10 87 85 81.

LIMITED WARRANTY

We warrant this product free from defects in material and workmanship under the following terms.

HOW LONG IS THE WARRANTY

Labor and parts are warranted for three years from the date of the first customer purchase.

WHO IS PROTECTED?

Only the first purchase customer may enforce this warranty.

WHAT IS COVERED AND WHAT IS NOT COVERED

Except as below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

1. Any product which is not distributed by us or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the Web site www.kramerelectronics.com.
2. Any product, on which the serial number has been defaced, modified or removed, or on which the WARRANTY VOID IF TAMPERED sticker has been torn, reattached, removed or otherwise interfered with.
3. Damage, deterioration or malfunction resulting from:
   i) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature
   ii) Product modification, or failure to follow instructions supplied with the product
   iii) Repair or attempted repair by anyone not authorized by Kramer
   iv) Any shipment of the product (claims must be presented to the carrier)
   v) Removal or installation of the product
   vi) Any other cause, which does not relate to a product defect
   vii) Cartons, equipment enclosures, cables or accessories used in conjunction with the product

WHAT WE WILL PAY FOR AND WHAT WE WILL NOT PAY FOR

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2. Whenever warranty service is required, the original dated invoice (or a copy) must be presented as proof of warranty coverage, and should be included in any shipment of the product. Please also include in any mailing a contact name, company, address, and a description of the problem(s).
3. For the name of the nearest Kramer authorized service center, consult your authorized dealer.

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All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

EXCLUSION OF DAMAGES

The liability of Kramer for any effective products is limited to the repair or replacement of the product at our option. Kramer shall not be liable for:

1. Damage to other property caused by defects in this product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss; or:
2. Any other damages, whether incidental, consequential or otherwise. Some countries may not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from place to place.

NOTE: All products returned to Kramer for service must have prior approval. This may be obtained from your dealer.

This equipment has been tested to determine compliance with the requirements of:

EN-50081: "Electromagnetic compatibility (EMC); generic emission standard. Part 1: Residential, commercial and light industry"

EN-50082: "Electromagnetic compatibility (EMC) generic immunity standard. Part 1: Residential, commercial and light industry environment".

CFR-47: FCC* Rules and Regulations: Part 15: “Radio frequency devices Subpart B Unintentional radiators”

CAUTION!

- Servicing the machines can only be done by an authorized Kramer technician. Any user who makes changes or modifications to the unit without the expressed approval of the manufacturer will void user authority to operate the equipment.
- Use the supplied DC power supply to feed power to the machine.
- Please use recommended interconnection cables to connect the machine to other components.

* FCC and CE approved using STP cable (for twisted pair products)

For the latest information on our products and a list of Kramer distributors visit www.kramerelectronics.com **where updates to this user manual may be found.**
We welcome your questions, comments and feedback.

Safety Warning:
Disconnect the unit from the power supply before opening/servicing.

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